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CONTENTS

ENERGY CONSERVATION

RATIONAL USE OF FUEL-ENERGY RESOURCES

Riga KOMMUNIST SOVETSKOY LATVII in Russian No 12, Dec 79 pp 20-28

[Article by E. Aushkap, Secretary, Central Committee of the Communist Party of Latvia: "Utilize Fuel-Energy Resources Efficiently"]

[Text] In order to ensure planned, proportional development of the socialist economy, the Communist Party devotes considerable attention to further expansion of this country's fuel-energy complex. We must note that our country is the only one of all the world's developed nations which meets its requirements with its own energy resources.

Thanks to constant care and concern by party and government, in the last 15 years fuel production has increased by 130%, including a 190% increase for oil, 340% increase for gas, and a 40% increase for coal. The economy's requirements in fuel-energy resources, however, are constantly increasing. Precisely for this reason tasks pertaining to further increasing fuel production were stated in the resolutions of the 25th CPSU Congress and the decisions of subsequent CPSU Central Committee plenums. CPSU Central Committee General Secretary L. I. Brezhnev, Chairman of the Presidium of the USSR Supreme Soviet, has pointed time and again to the particular importance of elaboration of a scientific, thoroughly grounded and economically substantiated energy program, which corresponds to the increased demands of the present stage of development of the socialist economy.

A no less important problem is advanced simultaneously with the problem of accelerated growth of energy output capacity -- rational and economical consumption of fuel and energy resources. Party and Soviet officials, ministries and agencies, and the toilers of our republic and of the entire country view resolution of this problem as a most important task for the nation as a whole.

Carrying out the directives of party and government, party city and rayon committees, republic ministries and agencies, executive committees of rayon and city Soviets, and industrial enterprises of union subordination located in the Latvian SSR have initiated in good time extensive efforts to ensure continuous growth in and conservation of fuel-energy and raw

material resources. Particular attention was focused on preparation for reliable and uninterrupted operation in the fall-winter period of electric power stations, boiler facilities, electric power and heat distribution networks, industrial and agricultural enterprises, transportation, utilities and municipal services in cities and rural areas, as well as on-schedule completion and startup of energy system facilities, and establishment at electric power stations, boiler facilities, enterprises, construction projects, on kolkhozes and sovkhozes, at transport organizations and office buildings of a requisite stockpile of fuel, and prompt hauling of the requisite quantity of coal, peat briquettes, firewood, home furnace fuel and bottled gas in order adequately to supply the population. Much importance was attached to increasing the harvesting of peat and cutting of firewood, determination and regulation of specific standard consumption figures and consumption limits on fuel-energy resources, preparation of schedules of regulation and limitation of consumption of energy resources, fuller utilization of secondary thermal resources, increased supervision over storage and consumption of fuel, utilization of electric power and thermal energy, and improvement in organization of planning and management throughout this republic's entire fuel-energy complex. Emphasis was also placed on extensive toiler socialist competition for thrift and conservation.

We must note that city and rayon party committees as well as primary party organizations have devoted considerably increased attention to these problems. In the Kirovskiy Rayon party committee in Riga, for example, matters pertaining to preparations for the fall-winter period were brought up for discussion on numerous occasions at meetings of the rayon committee bureau and at meetings of party-economic activists. Problems of thrift and economy are regularly addressed at work force party and worker meetings. The rayon party committee and Soviet executive committee, working jointly with officials of enterprises and organizations, drafted in a timely manner a comprehensive plan of conservation measures. A special operations group was set up under the auspices of the rayon executive committee to coordinate all efforts in the rayon to ensure deliveries, establish stockpiles and to monitor consumption of fuel-energy resources.

Trade union and Komsomol organizations as well as this republic's volunteer inspection entities have shown greater responsibility toward matters of thrifty and rational utilization of fuel-energy resources. Inspections were made at their initiative, to check the preparedness of enterprises and organizations for winter, as well as contests for the best suggestion for conservation of fuel, electricity and thermal energy.

At the majority of economic installations efforts were made to stockpile fuel for winter, in conformity with target schedules ratified by the Latvian SSR Council of Ministers. Latvian SSR Gosplan, this republic's ministries and agencies have focused greater attention this year on matters of improving the stability and reliability of fuel and energy supply to the economy.

A certain amount of work has been accomplished in the Latvian SSR Main Production Administration of Power and Electrification to ready for winter electric power stations, boiler facilities, electric power and heat distribution networks. Equipment is being serviced and repaired in conformity with major overhaul and routine maintenance schedules. The year's plan target pertaining to repair of turbine units and electrical networks was completed by 15 October. New generating capability was placed on-line on the eve of the anniversary of the Great October Revolution at the Kegumskaya GES, exceeding existing generating capacity by 170%. Preparation was completed on boiler equipment of main, distribution and block heat distribution networks of all district heating plants, as well as heat transport shop equipment, tracks and machinery. An aggregate of measures was performed to increase reliability of electrical distribution networks.

Naturally consumption of energy increases particularly sharply in the fall and winter, reaching a maximum load. Therefore one of the most important functions of the energy system is management of energy load and electric power consumption. Proceeding from this, schedules for restricting customer consumption in case electric power demand exceeds supply were drawn up. Electric power consumption limits during hours of maximum power system loads were assigned to all industrial customers. Latvian radio is used to inform energy users in a more efficient manner about adopted energy resource restrictions.

As a result of the work done by party, Soviet and economic agencies in this republic, preparations for this winter were conducted on the whole in a vigorous manner. Additional reserve potential was sought out for increasing energy capabilities and stockpiling fuel. Just in the first nine months of this year savings totaled more than 110 million kilowatt hours of electricity, 14,400 tons of standard fuel, and 389,000 gigacalories of thermal energy.

Nevertheless the state of affairs in this republic requires improvement. A concrete discussion on this topic was held at a meeting of republic party-economic activists in October, dealing with problems of readying the economy for winter. We should focus particular attention on certain serious deficiencies in order to prevent them from repeating in the future.

Our country possesses adequate reserves of fuel and energy resources, and the aggregate of these extractive industries has been developing at a priority pace in recent years. One should also bear in mind, however, that the production of fuel and energy resources is costing the state more and more, while consumption is continuously growing. Each year our republic alone consumes approximately 7.2 million tons of standard fuel. The percentage share of consumption by industry, the economy's principal sector, is 36% of the total, while that of agriculture is more than 13%, and of transport -- 26%. A total of 24% of consumption goes for meeting the needs of the public.

This year allocations for all types of fuel were on the whole specified promptly and almost fully, but the Latvian SSR Council of Ministers Main Administration for Supply and Marketing of Petroleum, Petroleum Products and Solid Fuel did not fully implement these allocations. In the first 10 months of this year, for example, furnace fuel oil deliveries ran 82,000 tons short, and the level of allocations delivery for the third quarter was only 83.5%. Coal deliveries ran only 92%. Thus a most important condition for stable operation of the economy was not observed -- prompt implementation of all allocations.

Top officials at a number of ministries and agencies failed properly to organize efforts to establish the requisite stocks of liquid fuel and coal for the winter. This applies particularly to the following ministries: Construction, Light Industry, Local Industry, and the Latrybprom Association. City and rayon executive committees failed to do everything possible in this area. Means of transportation were not always efficiently utilized in hauling fuel. Bulk plants at Mangali, Oshkalny, Gulbene, and Stende stations permitted above-standard tank car turnaround time.

Progress in procurement of firewood was a continuing cause of concern, particularly since public demand for this fuel is not yet being met. For an extended period of time republic Gosplan and Gossnab and the Ministry of Timber and Wood Processing Industry were not even able to reach agreement on firewood harvesting and delivery plans. As a result, in spite of the fact that the ministry slightly overfulfilled the plan as a whole for the first nine months, deliveries of firewood to a number of cities and rayons in this republic were running considerably behind schedule.

Decentralized cutting of firewood was far behind schedule. As of 1 November only 28,000 cubic meters had been harvested of the targeted 130,000 cubic meters. Firewood procurement is progressing poorly in Daugavpils, Ventspils, in Rezeknenskiy, Yelgavskiy, and Rizhskiy rayons. Only complacency on the part of officials can explain such sluggishness.

Utilization of waste which does not require secondary processing serves as an important reserve potential for conservation. In view of the complexity of the situation, the people at this republic's Ministry of the Food Processing Industry, as well as other agencies involved in wood processing should seek out additional possibilities of utilization of this waste.

Peat occupies an important position in this republic's fuel-energy balance. It is gratifying that the Latvian SSR Peat Industry Administration, in spite of adverse weather, has completed the year's fuel peat harvesting target of 1,396,000 tons. Natural gas is becoming increasingly important, with a percentage share of the fuel balance increasing from 22.7 to 29% during the years of the 10th Five-Year Plan. The 1979 target for filling the Inchukalnskoye underground natural gas storage reservoir has been completed. Including last year's carryover, the reservoir contains approximately 1,500 million cubic meters of gas, as compared with 1,300 million cubic meters at the beginning of gas withdrawal last year.

Checks, however, revealed a number of deficiencies in this area as well. In particular, officials at the Main Administration for Gasification of the Latvian SSR Council of Ministers did not fully and promptly utilize capabilities for redistribution of gas consumption limits among customers. Much remained to be done to ensure reliability of gas supply systems. Construction work was proceeding slowly on installation of a third gas collection station at Inchukalns, a new gas distribution center (GRS-1) in Riga, and installation of additional liquefied gas tanks in Liyepaya. Gasification of agriculture is proceeding at too slow a pace. Problems pertaining to centralized technical servicing of gas-supplied agricultural facilities have not yet been resolved. The main reason for this state of affairs lies in a lack of precise coordination of activities between the republic Ministry of Agriculture and Glavgaz.

Power supply this fall and winter is also operating under difficult conditions of a tight balance and shortage of generating capacity. The absolute maximum power system load is increasing by almost 8% in comparison with the corresponding period of last year. This indicates that in the near future it will be necessary to speed up construction of intersystem power transmission lines, making it possible to improve reliability of this republic's power supply.

Considering current objective difficulties, it is especially necessary to mobilize all reserves. Latvglavenergo, Glavneftetopsnabsbyt, the Latvian SSR Ministry of Construction, Daugavagesstroy, and the executive committees of the Soviets should show greater persistence in prompt completion of construction and movement on-stream of new generating capacity, with work stepped up on expanding existing facilities -- Riga TETs-2, and rayon boiler plants in the cities of Daugavpils, Ventspils and Yelgava, and the town of Tsesvayne. Matters pertaining to improving reliability of agricultural power facilities also demand unabating attention. And of course it is necessary to reduce power losses in electric power systems. At the present time in this republic they are the highest in comparison with other regions. For all practical purposes a substantial portion of the electricity generated at thermal electric power stations is expended on covering these losses. This situation is intolerable.

A large contribution to the nationwide campaign to conserve fuel and energy resources is being made by primary party, trade union, and Komsomol organizations together with volunteer organizations of the Scientific and Technical Society and the All-Union Society of Inventors and Efficiency Innovators, as well as work forces of industrial enterprises and organizations. Positive know-how in efficient utilization of fuel and energy resources has been amassed, for example, by the Olaynfarm Production Association. This association has achieved savings of more than 4% on thermal energy and 6% on electric power consumption by improving production processes, proper maintenance of heat distribution networks, heating, ventilation and hot water supply systems, insulation of housing, production and service buildings, temperature cutback in production and service buildings during non-working hours, and fuel system adjustment for the purpose of eliminating overheating of certain buildings. Purposeful work

to conserve resources is being performed at the VEF Production Association, at the Avrora Factory, at the Zasulauks Locomotive Depot, and at a number of other enterprises and organizations.

At the Sarkana Zvaygzne Plant, the Slokskiy Pulp and Paper Plant, the Rigas Tekstils Association, at the Daugavpils Locomotive Depot and certain other enterprises, however, economical, thrifty consumption of fuel and energy resources is apparently still considered to be a non-mandatory thing. As a result of this, in the first 9 months of this year the republic's industrial enterprises overconsumed 856,000 kilowatt hours of electric power and almost 16,000 gigacalories of thermal energy.

Overconsumption also occurs due to faulty energy resource standard-setting. The fact is that in practice frequently enterprises operate on experimental, statistical standards which are unconfirmed by the requisite technical-economic calculations. A large number of enterprises employ production standard figures in value terms, which makes energy conservation difficult. The percentage share of such standards is particularly large at enterprises of the Ministry of Local Industry and Ministry of Construction. Such plants as REZ, the Riga Light Bulb Plant and the Riga Lighting Fixtures Plan have 100% norming of electric power in value terms. Consumption of thermal energy at enterprises of this republic's woodworking industry and a number of others is determined primarily by experimental-statistical means.

Deliberately overstated specific energy consumption standards have been set at some enterprises, which enables them to achieve great "savings" undeservedly and without great effort. Precisely in this manner the Riga Textile Equipment Plant "saved" 14% on electric power in the second quarter, while the Stankonormal' and Etalon plants achieved savings of almost 20% each. Specific electric power consumption standards at the Daugavpils Elektroinstrument Plant in the first half of the year exceeded by almost 6% consumption rates for the corresponding period of last year. At the same time volunteer inspectors established that inefficient consumption of electric power represented almost 5% of monthly consumption here.

A similar method of "conservation" was also utilized with consumption of thermal energy at the biochemical preparations and Elektrokonstruktsiya Experimental Plant and at the Kholod Production Association.

Inspections revealed deficiencies in the area of reducing electric power and thermal energy consumption rates at the Biokhimreaktiv Scientific-Production Association, at the Rigakhimmash, Rigasel'mash and Yelgavmash plants, at the experimental mechanization equipment plant, and others. A large number of enterprises of the Latvian SSR State Committee for Supply of Production Equipment for Agriculture with an average daily consumption of thermal energy running 15 gigacalories and higher, have no specific thermal energy consumption norms at all. One cannot consider normal the fact that more than one third of the electric power consumed in this republic is not normed. Therefore Latvglavenergo and the

appropriate ministries and agencies should speed up elaboration of proposals on adoption of a system of norm setting in agriculture and the area of municipal and public services.

One effective direction being taken by the economy is more efficient utilization of secondary energy resources and thermal waste heat. At the present time the enterprises of the Latvian SSR obtain from utilization of secondary energy resources an additional approximately 300,000 gigacalories per year, which is equivalent to 53,000 tons of standard fuel. Calculations indicate, however, that there is a potential to achieve an annual additional savings of up to 150,000 gigacalories of thermal energy by recovery of heat from flue gases, heated water, and exhaust steam. In particular, there is considerable reserve potential for utilization of secondary energy resources at the Sarkanays Metalurgs Plant, the Sarkanays Kvadrats Production Association, the Livany Experimental Biochemical Plant, and others.

This past harsh winter made things very difficult for the enterprises of the Latvian SSR Ministry of the Construction Materials Industry. Due to shortages of fuel and energy resources and poor preparation for operation in winter conditions, many of them experienced a large number of entire-shift work stoppages -- the republic's construction organizations experienced for these reasons alone delivery shortfalls of more than 40,000 tons of cement, 30 million bricks, 7,000 cubic meters of precast reinforced concrete, 20,000 cubic meters of keramzit gravel and many other building materials, which greatly affected the state of affairs in the area of capital construction. A check made this fall, however, indicated that plans of measures to correct this state of affairs once again are not backed up by the requisite organizational work and are being executed in an unsatisfactory manner. At the Liepaya Buildings Materials and Structures Combine, for example, repairs were not completed on the hopper heating system, steam-curing chambers, boiler facilities, and shops had not been insulated. Thus the situation is similar to last year's.

Standard stockpile inventories of non-ore materials have not been established at the majority of reinforced concrete structures plants. A number of enterprises, including the Krotseny Cement-Slate Combine, the Saintsiyems Building Materials Combine, the Kuprava Plant and others failed to achieve their targets of reducing residual oil consumption in July-August, and thus have failed to increase fuel stores through conservation. Things are bad as regards repair of steam-curing chambers at reinforced concrete structures plants, and drying ovens and kilns at plants producing wall materials and drain tiles. The result is large losses of thermal energy.

Serious deficiencies were revealed by a recent check on maintenance and operation of boiler and gas facilities at the enterprises of the Ministry of Domestic Services. At the majority of facilities repair and adjustment had not been completed on boiler, gas and generator equipment,

and inventories of principal and backup fuel had not been stockpiled. Gas facilities at the Vilnis Production Association, Varavikšne Combine, and the Zvaygzne Factory were in a neglected state. The ministry has not organized intraagency monitoring of operation of hazardous facilities.

Party and government decrees are focusing all branches and sectors of the economy on observance of the strictest conservation measures. In this connection we cannot tolerate violations of established conditions pertaining to power output and electric power consumption. Even such leading work forces, however, as the Al'fa and Kommutator production associations and the Daugavpils Drive Chain Plant have violated these regulations. Many losses of fuel and lubricants have occurred at industrial enterprises, in construction and transport organizations, on kolkhozes and sovkhozes in this republic due to poor organization of record keeping, storage and supervision over their utilization. Proper order in the matter of gasoline consumption has not yet been imposed.

Party and economic officials are presently faced with an important practical task -- an all-out effort to prevent losses of fuel and energy resources in all areas of production and consumption. Absolute observance of the rules of storage, limits in consumption of fuel, steam, heat and electricity -- this is a standard for performance by each and every enterprise, each and every shop, and the concern of every worker. Consumption standards should be progressive and be grounded on the achievements of science, technology and advanced production know-how.

This republic's housing is definitely an object of particular concern. This past harsh winter clearly revealed all the defects and deficiencies in readying for winter. In Riga, Rezekne, Ludza, Livany and other cities there was a rather acute shortage of heat, there were interruptions in supply of gas, electricity, and hot water, as well as organizational breakdowns in public transportation. The lessons of last winter, however, have been ignored by many. In Dobel'skiy and Ogrskiy rayons there have been postponements and delays in preparing heat distribution lines and boiler equipment, and delays in insulation-inspecting and insulating housing. In Riga, Liyepaya, and Ventspils repairing and overhauling of furnaces in buildings of older vintage has been unsatisfactory.

Officials at Latvglavenergo have been insufficiently utilizing the reserve potential of existing heat sources for centralized heat supply. There are still instances of a narrow, parochial approach by boiler facility proprietors to meeting the needs of other users. Much justified censure, for example, has been evoked by the operations of the Tornyakalns boiler facility of the Dzintars Production Association. As a result of unsatisfactory equipment maintenance and operation it was necessary temporarily to cut off 14 heat customers. The republic Ministry of Food Industry, however, to which the association is jurisdictionally subordinate, failed to take immediate steps to impose proper procedures. The Straume Plant -- the principal client of a project to expand this boiler facility, is also unsatisfactorily performing its functions.

In Bolderaya the Riga Building Materials Production Association and experimental plant were slow about readying the heat distribution network

and heating system for winter operation, although last year the people residing in the community adjacent to these plants justifiably complained of extended stoppages of heat and water supply. Heating of worker housing this year was in fact delayed. The Ministry of the Construction Materials Industry is obligated to ensure not only uninterrupted production operations at enterprises but also normal conditions for the tenants of worker housing settlements and ministry-subordinate housing.

Taking into consideration the lessons of last winter as well as the present very difficult situation, it is essential to utilize as extensively as possible practical experience in establishing unified emergency repair services in this republic's cities and rayon seats. The Ministry of Municipal Services should act more swiftly in resolving problems of centralization in the heat supply system. According to preliminary figures, just unification of small, scattered boiler facilities in cities and towns would make it possible to obtain considerable savings: operating personnel would be reduced and specific fuel consumption could be reduced up to 10%, with savings of approximately 2.7 million rubles.

Large-scale heat losses, leading to a substantial overconsumption of fuel for heating, ventilation and hot water supply arise as a consequence of serious deficiencies in design, and in a number of cases due to poor quality of construction of production buildings, housing and heat distribution networks. Particularly severe complaints are made about the quality of seal on apartment building exterior wall panel joints, series 464 and 602. The keramzit-concrete panels manufactured by the enterprises of Promstroymaterialy fail to meet standards in insulating properties and unit weight. This has been discussed time and again, but the problem has not yet been resolved. Latvian SSR Gosstroy should speed up revision of a number of standards documents and boost requirements on thermal characteristics of housing and public buildings as well as on quality of construction work.

One of the causes of substantial heat losses in buildings and heat distribution networks is the sometimes unsatisfactory supply to construction jobs of efficient and effective insulation, packing and sealing materials, as well as fittings, devices and equipment for regulating heat and hot water consumption. Therefore the republic Gossnab and the appropriate agencies must take measures to satisfy the growing requirements of the construction people and operations services in these materials.

At the present time party organizations and economic officials are drawing up concrete plans for organization of execution of CPSU Central Committee decrees -- on further improvement of the economic mechanism and tasks of party and government agencies, and the CPSU Central Committee and USSR Council of Ministers -- on improving planning and increasing influence of the economic mechanism on improving efficiency of production and work quality. In light of the demands of these decrees, a long-range comprehensive program for conservation and improved efficiency of utilization of this country's fuel and energy resources extending to 1990 is being drawn up at the request of the USSR Council of Ministers. Its implementation will make it possible to solve the same problems in our republic as

well. In this connection scientists, designers and process engineers, planners and production innovators should focus principal attention on adoption in the nation's economy of machinery, motors, boiler facilities, process and other equipment which are more economical in fuel and energy consumption.

In the course of implementation of these decrees, at all levels of economic management, alongside performance of other tasks, particular attention should be focused on further improving planning and norming consumption of fuel-energy resources, establishment and application of appropriate systems providing incentive for economical consumption and performance of the requisite organizational, political and indoctrinational work in work forces, which in the final analysis will ensure fullest utilization of reserve potential and increased efficiency of societal production.

One should bear in mind that further intensification of work aimed at achieving fuel and energy savings requires a precision system and consistency. Party city and rayon committees as well as primary party organizations should continue in the future leading the movement for fuel and energy conservation, supporting and encouraging in work forces a spirit of innovativeness, and utilization of all mass political means to develop in each and every worker the qualities of an industrious master, with a thrifty attitude toward public property. The Soviets, their executive committee, permanent commissions, and the deputies themselves should exert more effective influence on conservation of fuel and electricity by industrial and agricultural enterprises as well as the general public. Volunteer inspectors can make an important contribution here. An important role in teaching the toilers production management is played by trade union organizations. Their job is to teach the art of economy, and to help uncover and utilize reserve potential. Worker meetings and production conferences, scientific and technical societies, efficiency innovators and inventors should devote more attention to problems of further increasing thrift. This republic's Komsomol members and young people should aggressively participate in the nationwide campaign for economy and thrift.

Common efforts by party and Soviet agencies, public organizations, economic officials, and work forces to achieve economical consumption of fuel and energy resources and to utilize them with the greatest return will unquestionably promote successful achievement of the targets of the 10th Five-Year Plan and implementation of the resolutions of the 25th CPSU Congress.

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RATIONAL USE OF FUEL AND ENERGY IN SARATOVSKAYA OBLAST

Moscow EKONOMICHESKAYA GAZETA in Russian No 52, Dec 79 p 5

[Article by K. P. Murenin, Secretary, Saratovskaya Oblast Party Committee: "Consume Fuel and Energy Efficiently"]

[Text] The Communist Party considers further growth and development of the fuel and energy complex as one of the most important program tasks. Alongside an increase in production of electric power and production of all types of fuels, efficient and economical consumption of available resources is of enormous importance. "The efforts of each and every work force, each and every worker should be focused," stated Comrade L. I. Brezhnev in his address at the November (1979) CPSU Central Committee Plenum, "on fuel and energy conservation."

At the Center of Attention of Party Organizations

The Saratovskaya Oblast CPSU Committee and other party committees attach particular importance to mass organizational support of efforts at conservation of fuel and energy resources, dissemination and adoption of advanced know-how, valuable initiatives and undertakings in this area. Each year questions pertaining to preparations for operating under fall and winter conditions are examined at conferences of party-economic activists in the oblast, in cities, towns and rayons, and at meetings of work forces of enterprises and organizations. City and rayon headquarters as well as commissions at enterprises and organizations are operating, monitoring execution of the specified measures. Reviews of reserve potential for conserving energy and increasing reliability of energy supply are regularly held, as are scientific-practical conferences and seminars. A mass inspection is held in this oblast every second Tuesday of the month.

All matters pertaining to improving efficiency of utilization of fuel-energy resources are coordinated by a commission of the oblast CPSU committee. Working in close contact with it is the party oblast committee council to promote technological progress. Comprehensive plans for retooling production and efficient consumption of fuel-energy resources have been drawn up and are being implemented at the majority of enterprises, on the recommendations and under the supervision of this council.

We have set up a scientific council of leading scientists and specialists to examine the major problems pertaining to growth and development of this oblast's economy.

The multifaceted work being done by party, Soviet and economic organizations is producing positive results. We anticipate that in 1979-1980 not less than 250 million kilowatt hours of electric power and 560,000 gigacalories of thermal energy will be saved, in addition to a significant increase in reliability of power and energy supply to industry, construction, transportation, kolkhozes and sovkhozes, municipal and service enterprises.

Principal Areas and Directions of Conservation

Work to achieve more efficient utilization of fuel and energy resources has assumed a systematic character. It is being conducted on the basis of a comprehensive plan drawn up on an oblast scale. Several fundamental areas of conservation are specified in this plan.

One of them embraces problems of reliability of power supply. We believe that the most important thing here is to create conditions for uninterrupted supply of electricity to enterprises by providing backup generating capacity, linking together power transmission lines, employing objective means of monitoring and control, and improving power network facilities and equipment. Meriting approval in this regard is the experience of the Saratov Receiving Amplifier Tube Plant. At this plant, as a result of renovation of power facilities and equipment, they have improved arrangements of supplying electric power to the shops and sections, have installed remote-controlled circuit breakers, while all enterprise substations and distribution facilities have been linked together, and obsolete equipment and instruments have been replaced with new ones. The efforts invested by the people at the plant are being repaid many times over; since the beginning of the five-year plan consumption of electric power at the plant has decreased by 10.5%, with a 40% increase in production. Other industrial enterprises have experienced similar results.

In this oblast's agriculture, more than 3,500 kilometers of power transmission lines have gone into operation in order to improve reliability of power supply; linking together of power lines is continuing, and a great many transformer facilities have been installed. A total of 3,500 additional power poles have been installed in the worst icing zones, and 1,600 kilometers of wire has been replaced. Ice-melting devices are being aggressively adopted. As a result, 60% of 6-10 kilovolt lines now have a backup power source. In 1979-1980 an additional 1,120 km of power lines of 35 kv and higher will be constructed, and power equipment will be renovated.

A major source of conservation lies in reducing specific fuel consumption to generate electricity and thermal energy, as well as electric power and heat consumption for power system needs. Work being done in this area is producing appreciable results. In the last 3 years alone our electric power stations have saved 42,000 tons of standard fuel in this manner.

Saratovskaya Oblast contains a highly-developed petrochemical industry. Industrial waste forming here is not ignored by power engineers. At Saratov TETs-2 alone savings of standard fuel have exceeded 300,000 tons since the beginning of the five-year plan through waste utilization. More petrochemical industry waste product could be collected and sent to power generating plants, as well as discarded oil used in industrial processes. Plans call for doing this as well in the near future.

From the standpoint of efficient fuel combustion, one should give adequate consideration to a shift to centralized supply of heat to customers from TETs, as well as elimination of small boiler facilities. In recent years 283 old boiler facilities have been shut down and 250 new, poor-efficiency boiler facilities have been removed from construction plans. It has been calculated that this has resulted in eliminating the consumption of 100,000 tons of fuel.

Effect of New Equipment and Technology

Adoption of new equipment and advanced technology is a reliable way to achieve conservation of energy resources. Party organizations are constantly directing the creative efforts of specialists and worker-innovators toward reducing the energy requirements of production. The experience of this oblast's leading enterprises serves as an example.

Structural analysis of electric power consumption is handled well at State Bearing Plant-3. On the basis of such analysis, in last 18 months more than 100 substantial measures have been taken at the plant to modernize and upgrade existing equipment and to replace it with new and more economical equipment. In particular, an automatic line for heat treatment of parts was installed in the bearing cage forging shop, a line which unified eight process operations which had previously been performed on different equipment. Replacement of obsolete conveyer electric heat-treating furnaces with roll-table units and new-model electric heat-treating furnaces has produced savings of 832,000 kilowatt hours of electricity per year.

Seeking to achieve economical utilization of energy resources, the people at the Nitron Production Association are placing the main emphasis on improving industrial processes of producing ethyl alcohol and synthetic fiber. The result for this year to date is savings of two and a half million kilowatt hours. The Electrical Equipment Machine Building Association and a number of other enterprises have amassed experience in automated control and management of power supply processes.

Since the beginning of the five-year plan the enterprises of this oblast have carried out more than 8,500 organizational-technical measures to conserve fuel and energy resources. A total of approximately 3,200 points of inefficient energy consumption were discovered and corrected. It became possible to save 534 million kilowatt hours of electric power and 885,000 gigacalories of thermal energy. By the end of the five-year plan an additional several hundred measures to improve industrial processes are slated to be implemented.

Consumption of electric power and thermal energy within consumption limits and standard figures established for all enterprises and organizations is being more closely monitored. At the present time more than 70% of consumption of electric power and thermal energy is being monitored daily, while half of all consumed electric power is being monitored hourly. Practical experience attests to the high degree of effectiveness of such a measure. Therefore the task has been stated to convert the majority of enterprises over in the future to identical forms of monitoring.

Recently more attention has been focused on technical substantiation of standard electric power and thermal energy consumption figures and elaboration of organizational-technical conservation measures. A useful role is played by comprehensive studies of enterprises within the system. This year more than 1,500 enterprises and organizations were examined in the course of mass verification of utilization of fuel and energy resources.

Long-range schedules of electric power supply under conditions of restrictions and power shutoffs are being employed in our oblast. This is the right way to proceed in order to stabilize enterprise operations. As a result, during a period of extremely cold weather savings of electricity ranging from 3 to 5% were achieved.

Much has been done and is being done to achieve savings in various kinds of fuel and energy. But this does not mean that deficiencies have been corrected and difficulties eliminated completely. They still exist. We believe that in order to overcome them it is necessary, under conditions of heavy fall-winter electricity consumption, for a firm maximum electric power consumption figure to be specified for each enterprise and organization, providing for backup generating capacity.

And finally, it is necessary in 1980 and especially in the 11th Five-Year Plan to renovate power transmission lines. The fact is that as a result of insufficient study of climatic conditions in the rayons of Saratovskaya Oblast, power lines were designed on the basis of figures which do not correspond to actual wind and ice loads. For this reason line damage frequently occurs. This abnormal condition can be corrected only by means of line renovation.

Enormous reserve potential lies in decreasing the specific power requirements of machinery and equipment. This indicator should become one of the principal indices in evaluating the sophistication of design and degree of advanced engineering of new equipment. It would seem evident that in this area branch standard figures and recommendations must be elaborated.

Supported by achieved experience, the Communists and toilers of Saratovskaya Oblast will do everything in their power to achieve further improvement in efficiency of utilization of fuel and energy resources in light of the party's instructions.

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CSO: 1822

ENERGY CONSERVATION: PROBLEMS AND PROGRAMS

Moscow TRUD in Russian 18 Dec 79 p 2

[Article by V. Il'inskiy, chief of the Main State Inspectorate of USSR Gossnab: "A Bar to Losses"]

> [Text] The all-Union public inspection of the efficiency of use of raw and processed materials and fuel and energy resources is underway.

In the first half of this year alone 16 organizations of USSR Goskomsel'khoztekhnika overexpended more than 600 tons of automotive and diesel fuel. In the same time 34 organizations of Goskomsel'khoztekhnika illegally sold more than 1,000 tons of various oil products on the side. These were facts uncovered by inspections made by the Main State Inspectorate of USSR Gossnab.

In his report at the 25th party congress, General Secretary of the CPSU Central Committee L. I. Brezhnev particularly stressed that with the continuous growth in the wealth of our society one of the crucial conditions for raising the people's standard of living and developing the national economy is rigorous thrift and economy measures. The same subject was discussed at the November 1979 Plenum of the CPSU Central Committee.

We have large reserves of petroleum in our country. They are large, but not unlimited, and they demand a prudent, proprietary attitude. At many enterprises the campaign for economy and thrift has made it possible to significantly reduce the consumption of liquid petroleum products. In the Ukrainian SSR Ministry of Housing and Municipal Services, for example, 4,715 tons of automotive fuel, more than 700 tons of diesel fuel, and 165 tons of lubricating oil was saved in 1978. But unfortunately, one more often encounters exactly the opposite.

For example, this spring the Main State Inspectorate of USSR Gossnab, in cooperation with the main administrations for supply and marketing of petroleum products of the Union republics, checked on the use of petroleum products at 355 enterprises of the USSR Ministry of Land Reclamation and Water Resources. The inspection showed that more than 30 percent of these enterprises are scarcely participating in the all-Union public inspection. They have not written up measures to conserve petroleum products or these measures are being developed in a formalistic manner, without stipulating specific times and responsible persons and without calculating the expected savings. This was the main reason that 60 percent of the enterprises of the RSFSR Ministry of Land Reclamation and Water Management and many enterprises in Belorussia and other Union republics did not fulfill their assignments to save an additional 2-3 percent of gasoline and diesel fuel (1978). Far from it, mobile mechanized column No 12 of the Ryazan' Land Reclamation Association used 3.2 percent too much fuel last year, and motor pool No 2 of the Tadzhik SSR Ministry of Land Reclamation and Water Management burned five tons of automotive fuel too much in the first quarter of this year alone. These are not isolated cases.

There are many reasons that fuel is wasted. At the Bataysk Motor Vehicle Transport Enterprise No 2 of the same RSFSR Ministry of Land Reclamation and Water Management 250 tons of fuel a year is used to warm up engines during the cold season. It seems obvious that they should provide centralized engine warming before starting, but unfortunately this is not done. The ones primarily responsible are the enterprise managers, who have not provided the necessary conditions for this.

This kind of waste is not found only in Bataysk. We will give more cases. In warm, sunny Moldavia most of the motor pools of the republic Ministry of Construction and Operation of Vehicular Roads warm up vehicle and machine engines before starting them. At the Rybinsk Special Vehicle Enterprise of the RSFSR Ministry of Construction and Operation of Vehicular Roads, which is located much further north, this is not done and they lose less than 30 tons of gasoline a year. At the Donmyasoprom [Don Meat Industry] Association of the RSFSR Ministry of Agriculture they lose up to 1,000 tons of fuel a year by providing winter heating and prestart warm-up for 70 percent of their equipment.

However, if we take the reports of conservation of fuel and energy resources, it appears that most of the enterprises, ministries, and departments are meeting their assignments for reducing the use of petroleum products. What do these figures represent?

In 1978, for example, the Uzbek SSR Ministry of Municipal Services conserved 410 tons of automotive fuel, two percent of the total volume of consumption. But was the fuel requirement of the vehicle enterprises of this minsitry correctly determined? The inspection showed that the

general calculation of fuel needed for all vehicles at the Karshi Special Sanitation Vehicle Depot was 1,011 tons, but according to norms the depot really needed just 750 tons. Records at this vehicle depot are very poorly organized. Drivers fill out trip logs incorrectly, do not show the amount of gasoline in the tank when they leave the garage and when they return, and frequently overstate the distance of hauls and the total distance traveled.

Norms and records of fuel use are especially poorly organized in agricultural organizations. When drawing up annual industrial-financial plans many kolkhozes and sovkhozes use overstated norms for the level of fuel expenditure. For example, the Kolkhoz imeni Engels in Maykopskiy Rayon of Krasnodarskiy Kray adopted a norm for gasoline use in vehicle shipping in its 1978 industrial-financial plan of 270 grams per ton-kilometer instead of the approved norm of 165 grams. At the other farms of this rayon the planned norm of gasoline use was also 10-40 percent too high. But the rayon Sel'khoztekhnika Association distributed fuel allocations in exact conformity with kolkhoz and sovkhoz requests, without any checking.

Inspections revealed serious problems with records of use of petroleum products at many agricultural organizations. For example, at kolkhozes and sovkhozes of Pavlovskiy Rayon of Altayskiy Kray, 70 percent of the vehicles going on line do not have working speedometers. Standard instructions are not followed there in filling out trip logs. Similar situations can be observed in various other rayons and oblasts of the RSFSR and other Union republics.

We must see that all state and kolkhoz vehicles without exception have working speedometers. But, while large vehicle enterprises are able to monitor the mechanical condition of their vehicles and machinery, practically no one in small organizations keeps track of driver work and the mechanical condition of the vehicles. It seems that the state vehicle inspectorate might be brought in to provide this monitoring. In addition, agencies of the vehicle inspectorate, if they were supplied with appropriate equipment, could also monitor the condition of the fuel apparatus of machinery. After all, an improperly adjusted carbueretor entails not only additional losses of fuel, which may be considerable, but also pollution of the atmosphere.

The system of material incentives for conserving fuel and energy resources needs improvement. At the present time bonuses for fuel conservation are awarded depending on the value of the fuel saved. But gasoline, diesel fuel, and lubricating oils are very inexpensive in our country. As a result, the bonuses are not large enough to give people an interest in conserving fuel. It seems that the index for reducing expenditure of fuel and energy resources, in particular petroleum products, should have an effect on the size of

enterprise economic stimulation funds. This would uncover new ways to conserve fuel.

It is also essential to supply vehicle enterprises with refueling equipment very soon. This will make it possible to save about two percent of our fuel and up to 10 percent of lubricating oils which are lost when machines are refueled with buckets and cups. We must accelerate the construction of storage facilities for petroleum products, providing them with the necessary equipment to reduce fuel losses. The situation with petroleum storage facilities today leaves much to be desired. For example, at the time of the inspection 10 of the 14 petroleum storage units of the Moscow River Steamship Line of the RSFSR Ministry of the River Fleet needed repair and rebuilding. At 51 enterprises of the USSR Ministry of Land Reclamation and Water Resources the annual fuel loss for the same reasons is more than 2,000 tons.

With the enormous volume of fuel and energy consumption in our country, a reduction in usage of just one percent would save 17-18 million tons of standard fuel a year. The efforts of every collective and every individual worker should be directed to solving the problems of conserving fuel and energy.

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USING SECONDARY ENERGY RESOURCES

Tashkent PRAVDA VOSTOKA in Russian 25 Nov 79 p 3

[Article by D. Akhmedov, director of the Central Asian Branch of the All-Union Scientific Research Institute of Gas Utilization in the National Economy and of Underground Storage of Petroleum, Petroleum Products, and Liquefied Gas, candidate of technical sciences, and winner of the Beruni Prize, and I. Gol'dberg, senior scientific associate and candidate of technical sciences: "The Price of Combustion"]

[Text] The wind stubbornly attacked the many fingered yellow flare. A natural gas flame was ignited above the pipe from which the flare was shooting to prevent the wind from extinguishing it. But some times the wind would win out, and then a cloud of return gas, a waste product from chemical production, would spread over the territory adjacent to the Chirchik Elektrokhimprom [Electrochemical Industry] Production Association.

That is how it was until 10 July 1975 when this gas (a good part of which is toxic carbon monoxide) began to be used at the associations's central heat and electric power plant. Associates from the Central Asian Branch of the All-Union Scientific Research Institute of Gas Utilization in the National Economy and of Underground Storage of Petroleum, Petroleum Products, and Liquefied Gas developed combined burners to burn it in the furnaces of the boiler units. In these burners natural gas supports the combustion of the return gas. These burners can burn natural and return gas either together or separately. In addition, they can use liquid fuel. Operating them has demonstrated that they are highly efficient and reliable.

But the beginning of work to reuse return gas was quite hard. Many specialists at Elektrokhimprom considered it feasible, but even the most experienced power engineers predicted a decrease in boiler efficiency.

Institute associates submitted calculations to the energy section of the technical council of Elektrokhimprom which showed that a certain organization of the furnace process could prevent a drop in boiler economy.

The work followed the calculation. Manufacture of the burners was begun at the association using plans from the design bureau of the institute. Chief engineer V. A. Yakovlev visited the workshops constantly, watching every stage of the manufacture and installation. Then the burners were scrupulously tested. And now we see the final stage of the work. Return gas is no longer expelled into the air; it is sent to the furnace of the boiler.

Careful heat engineering studies showed that the new burners insure complete combustion of return and natural gas. At the same time the reliability and economy of the boilers rose.

In 1978 low-pressure return gas began to be burned in specially designed burners at the central heat and electric power plant of Elektrokhimprom. The annual savings of natural gas from replacing it with return gas was 14.3 million cubic meters, according to the association's calculations. In monetary terms this is 158,000 rubles. But the benefits here are greater than any amount of money. Pollution of the atmosphere with carbon monoxide has stopped and ammonia is no longer run off into the Chirchik River.

The alliance of science and production yielded tangible results. Today all eight boilers at the central heat and electric power plant at Elektrokhimprom have burners built on the basis of author's certificates of institute employees. Many other enterprises have shown an interest in burners to burn waste gases. One such device has already been introduced at five boiler units of the Novomoskovskiy Azot Production Association, the leader of the country's large-scale chemical industry. Incidentally, this burner design has been patented in the United States, France, England, and West Germany.

Institute associates have now fixed their attention on the use of secondary energy resources at the Navoiazot Production Association. Working with the technical division and power engineers of the association, institute scientists have defined the places at which secondary energy resources are lost. The institute has developed burners whose introduction will make it possible to save 17,000 tons of fuel. The next thing on the agenda is development of devices to recycle gases containing acetylene and solid soot particles, which severely pollute the nearby regions. It should be observed that the Navoiazot Association does not have to take care of manufacturing the burners. This job is being assumed by the Leninabad Gas Fixtures Plant.

Chemical enterprises still lose large amounts of secondary resources. Losses of secondary combustible energy resources for the entire Ministry of the Chemical Industry are 55 percent of production. These include tank , tail, and blowout gases, gaseous hydrogen, contaminated kerosene, diesel oil, green oil, and the like.

It would seem that the role of cooperation between science and practice in solving such an important problem would be obvious. For this reason the position of the employees of the Fergana Nitrogen Fertilizer Plant is surprising. They have rejected the institute's suggestion concerning cooperation. Meanwhile the plant discharges about 56 million cubic meters of return gases into the atmosphere each year, an amount that could replace 5.5 million cubic meters of natural gas.

The efficiency of using industrial gases burned off in flares or emitted into the atmosphere has been proven by cooperation between science and production. Plans and designs for burners have been tested and should be used. A great deal now depends on workers in industry to see that enterprises of the republic put an end to losses and achieve new savings. Moreover, this is not simply a matter of economy, but also concerns environmental protection.

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ENERGY CONSERVATION IN KISHINEV

Kishinev SOVETSKAYA MOLDAVIYA in Russian 28 Nov 79 p 3

[Article by V. Khrenov, chairman of the Kishinev City People's Control Committee: "A Managerial Approach"]

[Text] The principal city of the republic consumes about 1 billion kilowatt-hours of electricity, more than 150,000 tons of fuel and lubricants, and more than 200,000 tons of solid fuel and mazut oil annually. One of our main challenges is to keep strict track of resources and follow the strictest economy measures.

Under the leadership of party organizations the people's control committees and groups, working together with Komsomol "Searchlight" members, are working hard during the republic's public inspection of ways to increase the efficiency of production and intensify economy measures with the objective of finding, preventing, and eliminating cases of mismanagement and waste in the use of electrical energy and fuel. They are holding officials strictly responsible for their assigned jobs.

This is being accomplished primarily by large-scale inspections. Last year they covered more than 800 enterprises and organizations in the city. More than 12,000 patrol and volunteer inspectors of the city and rayon people's control committees and members of the Komsomol Searchlight headquarters took part in the great campaign for thrift and economy.

During the inspections primary attention was devoted not only to finding problems but also to taking care of them immediately. For example, at suggestions by our activists 78 large electric motors were replaced with optimal ones at enterprises in Oktyabr'skiy Rayon lighting plans were scaled down at 12 plants and factories, and fluorescent lights and other mercury devices are now used in place of 1,880 incandescant bulbs.

The results of the mass inspection were discussed at the bureau of the city committee of the Communist Party of Moldavia. The bureau urged economic managers to take steps to straighten out procedures in the use of fuel and energy resources.

The city and rayon people's control committees systematically discuss the state of affairs with respect to this important matter and call to account those who adopt a wasteful attitude toward public wealth. In this year alone 112 managers of heat and electricity services and chief engineers of enterprises and organizations have presented explanations of problems to us. Some of them were given significant punishment. After analyzing the experience of past years, the people's control committees and groups wrote up concrete plans of activities to strengthen control of norm settings, record keeping, and expenditure of electricity and fuel with application to the specific features of each enterprise or organization. This made it possible to eliminate gaps in preparations for winter at the proper time and to identify existing ways to save energy resources.

During the mass inspection patrol members found that 31 enterprises of the city do not keep track of heat and electrical energy by shops. How can specific norms for energy use relative to production of output be introduced in this case? Competition for thrift and economy became senseless because the result could only be roughly summarized.

This matter was discussed at a session of the city people's control committee. It was pointed out that this "lack of identity" in the use of heat and energy resources had come about during designing of new and reconstruction of existing enterprises. Specifically, this was the case with the household chemicals plant, the finishing materials plant, and the Experimental Plant imeni Kalinin. The fact that separate lighting circuits were not envisioned at these and certain other enterprises also resulted in inefficient use of electricity.

At the insistence of the city people's control committee many economic managers took necessary steps to set up records of heat and electrical energy by shops.

There are up to 15,000 welding units at enterprises in Kishinev, and more than half of them do not have idle stops. As a result extra electricity is used. Where can the necessary device be obtained? For some reason the manufacturing plants generally produce welding units and other industrial equipment without idling stops. The time has come to supply these stops to industrial enterprises and construction organizations of the republic in a centralized manner.

The campaign for economical use of electricity and fuel should be a mandatory norm in the work of each production collective and worker.

However, at some enterprises the campaign is moving very slowly and lacks engineering substantiation or a creative approach. In the third quarter of this year the glass plant used 500,000 kilowatt-hours of electricity beyond the norm and the building materials combine went over by 325,000 kilowatt-hours. What was the reason? Inside lights were not turned off at the right time, steam and compressed air were allowed to leak away, and high-grade concentrate was emitted into the atmosphere.

Serious charges must be made against the management of the Kishinev Unified Central Heat and Electric Power Plant by the city and rayon heat system. This applies chiefly to the maintenance of central heat points, many of which are poorly managed and allow considerable amounts of steam to leak away.

There are large reserves for efficient use of electricity and heat in housing and municipal services. Light bulbs that are too powerful are used in many entryways of buildings, on stairwells, and in basements and rooms. Heat and water are permitted to leak. Electrical panels are broken. And many doors in basements and entryways are not closed during the autumn and winter.

Questions related to automating the control of general building lights must be solved.

The city and rayon people's control committees, groups, and posts consider their prime challenge to be seeing that each worker takes a proprietary attitude toward public wealth and uses electricity and fuel as economically as possible at every work position.

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FUELS AND RELATED EQUIPMENT

DENSITY OF OIL-WELL NETWORK AND OIL OUTPUT

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 1, Jan 80 pp 65-74

[Article by A. P. Krylov, academician, chairman of the Scientific Council on Problems of Developing Oil Fields of the USSR Academy of Sciences, Lenin and State Prize laureate, Moscow: "Rates of Development of Oil Fields"]

[Text] The oil extracting industry is one of the "hot points" in the economy at the modern stage. Doctor of Economic Sciences M. M. Brenner, Doctor of Economic Sciences L. P. Guzhnovskiy and others (EKO, No 6, 1974; No 6, 1977; No 1, 1978) have already discussed the state and outlook for development of this branch on the pages of the journal. The journal continues publication of urgent materials on the oil extracting industry.

In the USSR a number of major oil extracting regions have entered a period of stabilization; at the same time new, large centers of oil extraction are being formed.

The article of Academician A. P. Krylov examines one of the central problems in the development of oil extraction associated with the efficient methods of working the oil fields.

Drilling wells for oil is a very capital-intensive process that annually requires over 1 billion rubles. An increase in their effectiveness requires definition of the efficient density of the well network, and the extraction and level of output depend on this.

In analyzing the practice of working oil fields and a number of method aspects in the theory of planning Academician A. P. Krylov advances new principles for optimizing the

rates of recovery of supplies, and consequently, the network for arrangement of the wells, and improvement in the organization of drilling operations from the position of national economic effectiveness.

About 30 years ago, thanks to the new approach to solving the problem of working oil fields a sharp improvement began in the effectiveness of oil extraction in the country, mainly due to:

thinning of the well network (which resulted in a decrease in the number of wells to be drilled in the oil fields and increased the supplies of oil for one well);

maintenance of the formation pressure by injecting water into the bed.

The introduction of these measures created the conditions under which there was a sharp increase in the stability of well output and their average yield, and the oil output of the beds rose. All of this affected in the most favorable manner the technical and economic indices of the branch, and with comparatively small outlays of capital investments and material and technical resources permitted a rapid growth in oil extraction in the country. However in the last decade the effectiveness of oil extraction began to continually and significantly drop. Several factors governed the emergence of such a situation, but the most important of them is the increase in the percentage of outlays for the maintenance of the attained extraction level. This percentage of outlays is proportional to the coefficient of drop in extraction at the wells to be operated, passing into the next year. In turn, the average amount of the coefficient of drop depends on the correlation of well yields and the amount of the current supplies, that is, on the rates of oil extraction.

The rates of working oil fields can be examined in two aspects: in an economical, where the rates of oil recovery from the supplies is examined, and in a technological, where the rate of movement of the oil content contours is examined. Certain researchers consider these two aspects to be equivalent since one can have a relatively low oil recovery from the supplies and at the same time high rates of movement of the oil content contours, and vice versa. We will dwell further only on the first aspect.

The rates of working oil fields have primary importance not only for the individual field, but also for the development of the oil extracting industry as a whole. However obvious misunderstandings have been encountered up to now in the solution to this important problem. Such an example can be given as an illustration.

In a recently published work[1] it is asserted that before the use of methods of flooding on natural patterns "the development usually occurred at low rates (1-2% per year of the supplies to be extracted)." Further this work states that the "broad introduction of flooding at the oil fields of our country permitted high rates of development to be guaranteed." And

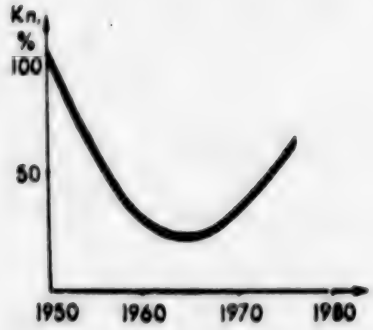
it completes its statement on this question with the following words: "Thus, the high rates of working of the oil fields in the Soviet Union that guarantee the highly effective indices, can be considered completely scientifically substantiated."

In fact, everything occurred just the opposite. Before the beginning of industrial introduction of flooding (before 1950) the development of fields on the average for the branch occurred at high rates. Then, as the flooding was developed, it began to drop sharply, and in the first 10-15 years of flooding introduction the rates of development dropped roughly 4-fold.

The question of the expediency of drilling out the fields according to a thinner network of wells was raised long before the use of flooding.[2] However, only with the introduction of flooding was the barrier of conservatism finally overcome successfully and a noticeable thinning of the network of wells was achieved. As a result, the supplies for one well were increased 6-10-fold. Therefore, although the flooding did increase the average yield of the wells, the rates of development of the fields generally began to significantly diminish. Thinning of the well network had an exceptional effect on the development of the branch. If only flooding had been used with the same scope and the densit. of the wells remained unchanged, then, as the computations show, with the same rates of drilling as now we would have a roughly 3-fold (!) lower extraction than the actual. In other words, if only flooding had been used, that is, the rates of development were actually increased, then with the same volume of drilling only one-third of the actually extracted oil in the year would have been obtained.

Thus, one can state that the main role both in the increase of oil extraction rise, and in the improvement of economic effectiveness of the branch development as a whole...was not played by the increase in the rate of development of the oil fields, but on the contrary, its decrease, reached by increasing the supplies of oil in one well.

To trace the change in time in the rates of development of oil fields one can analyze the dynamics for the coefficient of drop in oil extraction according to the transition fund-- K_n. The figure presents a smoothed curve of the change in relative amounts of coefficients of drop in extraction, starting in 1950 up to recently. It is apparent from this figure that after 1961 the coefficient of drop reached a value which is roughly 4 times smaller than the starting. But approximately from 1968 the amount of the coefficient of drop in oil extraction begins to rise sharply. The increase in the coefficient of drop, as is known, results in an increase in the percentage of oil obtained from the new wells which compensates for the drop in extraction at the old wells. The importance of this percentage, as a consequence of the growth both in the absolute amount of oil extraction and the coefficient of drop, can reach that level at which further development of the branch is encountered with considerable difficulties.



Dynamics of Coefficient of Drop in Oil Extraction

Preliminary computations demonstrate that if the current rate of annual increase in the number of new operational wells and the current rate of increase in the coefficient of drop are preserved, then oil extraction for the country in a comparatively short period of time will reach its maximum, after which it will start to drop. This course of events can be changed and one can emerge onto the planned volume of extraction either by increasing the rate of rise in the new wells (which is linked to the increased capital investments and expenditure of pipes), or by switching to technologically and economically substantiated systems of working that will lead to thinning of the well network and reduction in the coefficient of drop (this will not be linked to additional capital investments).

We will examine the possible causes that entail an increase in the coefficient of drop.

In the last decade the average yield of wells was increased roughly by 25%, which with unchanged supplies for one well had to result in a corresponding increase in the coefficient of drop. In fact, the coefficient of drop during this period was increased, not by 25%, but roughly by 150%. It follows from here that the primary reason for the increase in the coefficient of drop is not the rise in the average yield of the wells, but the continuous decrease in the supplies of oil for one well, which occurred due to the concentration of the well network, and partially the subdivision of the operational facilities.

The increase in density of the well network can be induced by different reasons: insufficient volume of prepared supplies of oil of industrial categories; technological considerations; difficulties induced by the insufficient maneuverability of the drilling operations.

Lagging in the preparation of oil supplies of industrial categories with an unchanged amount of supplies for one well must result in an increase in the degree of use of the supplies, that is, in an increase in the ratio of supplies in category A to all the industrial supplies. In fact, this ratio was not increased but significantly decreased. Consequently, the rise in the coefficient of drop mainly was induced by excessive concentration of the well network.

Usually in discussing the question of the density of the well network certain reasons of the production plan are named that supposedly prompt concentration. Only the considerations of the coefficient of oil output, and in particular, the attainment of the planned amount of oil output, as well as on the newly adopted criterion for optimality of the system of working are the most justifiable and deserving of examination.

How competent is the requirement to attain the planned amount of oil output?

The planned amount of oil output is determined with the confirmation of supplies in the State Committee for Mineral Resources (GKZ) based on a comparat'vely small volume of data on the structure of the bed, geological and physical properties of the rocks, and properties of the liquids saturating the bed, and as a rule, before compilation of the technological plan for working. Based only on this information the coefficient of oil output can be estimated only approximately.

Therefore it is impossible to require the attainment by any means of the planned, that is the approved coefficient of oil output. In some cases the fulfillment of this requirement can result in superfluous outlays, and in others, to burial in the bed of unjustifiably large supplies of oil.

Instead of this, in accordance with the specific situation the most effective methods, but in the limits of economic expediency, should be used to attain the greatest coefficient of oil output that can be equal, greater or lesser than that approved by the GKZ.

The question as to the effect of the well network density on the amount of oil output has an ancient history. No one doubts that the density of the well network affects the amount of oil output. The question is only of the degree of this influence under certain conditions of oil occurrence.

Analyzing many years ago the reasons that could reduce the coefficient of oil output with a thinning of the well network we came to the conclusion that under conditions of water-displacement of oil the main reason for this can be the incomplete coverage by displacement of the entire volume of the oil-saturated rocks. Thus, the coefficient of oil output began to be represented as a product of two coefficients, displacement and coverage.[3]

A study of the coefficient of coverage indicated that its amount mainly depends on the geological structure of the bed. The first works in this direction were made with an examination of the process of oil displacement along the profile of the geological bed structure built from actual data in the direction of liquid movement. The findings were used in planning the first general plan for development of the Romashkinskiy field, and the method was discussed at the all-union conference of oil extraction workers in Kuybyshev in 1956. Subsequently this method was developed in other works.[4]

In recent years works have appeared[5] in which, based on another model of the bed attempts are made to take into consideration the effect of the geological structure of the beds on the coefficient of oil output. However, these studies unfortunately were not clearly brought to an end since they did not consider a number of factors, of which the main are the regulation of the process of using the deposit, as well as the use of the potentialities linked to the drilling of a reserve fund of wells. With a comprehensive approach to an examination of this question we naturally obtain quite different relationships. In particular, the coefficient of oil output of single-row systems will not be greater than in the multiple-row as the authors obtained, but on the contrary, lower.

The effect of the well network density on the oil output has been evaluated many times by different groups of researchers based on an analysis of the experience of working. In addition, in 1957 a special field experiment was set up for this purpose at the Bavlinskiy field. Generalization of the experimental working conducted independently of each other by different groups of researchers invariably showed the insignificant effect of the well network density on the amount of oil output in the limits of a comparatively low oil viscosity under bed conditions, up to 5-6 centipoise (the most studied group of deposits).

The Bavlinskiy experiment consisted of the following. The main part of the deposit drilled according to a network of 20 ha/well, was thinned to 40 ha/well; here work was stopped on half of the wells. After the passage of the water front in the flooded section of the deposit the previously stopped wells were started up and an evaluation was made of how much additional oil could be obtained if the network was concentrated two-fold. The experiment is still continuing, but preliminary results indicate that the oil losses in the bed do not go beyond the limits of the calculated.

To minimize the possible losses of oil in the bed it was suggested that besides the main fund of wells a reserve be also provided for. The reserve fund comprises 10-30% of the main depending on the complexity of the bed structure. The wells in this fund should be placed in those areas where the main well network (due to the peculiarities of the geological structure of the bed) is not capable of removing all the oil. Thus, the selectively, in accordance with the geological conditions, adopted well network only at individual, very limited sections of the deposit can be concentrated two-four-fold. This makes it possible according to the completeness of the oil recovery from the bed to bring the deposit that is nonuniform in structure closer to the uniform.

The proponents of the dense well network to guarantee the highest possible coefficient of oil output consider it necessary not to selectively concentrate the network, but to drill continuously all the field on a denser network. This results in drilling of a large number of wells whose main portion will not affect the increase in coefficient of output, but only reduce the effectiveness and development of the oil extraction.

Nevertheless, despite all the arguments of the technological and economic plan, concentration of the well network continues clearly above the reasonable limits. The unsubstantiated striving towards concentration of the well network leads to the unjustified and premature decrease in the effectiveness of oil extraction.

To a certain degree such a situation has been created as a consequence of the fact that in recent years in selecting the system for working the previously adopted criterion was not used that required the minimum outlays for exploration, extraction and transportation of the level of oil extraction planned for the branch. The Ministry of the Petroleum Industry acknowledged this criterion to be incorrect and replaced it with another, adopted in 1973 at the all-union conference of the Scientific and Technical Council and the Central Commission for Working Oil Fields of the Ministry of the Petroleum Industry in Al'met'evsk. The decision of the conference recommended: "In selecting and implementing the system of working operational facilities the following primary principle should be the starting point: the systems of working should provide sufficiently high rates of oil extraction, the optimal dynamics of the technological indices, and attainment of the highest possible oil output with favorable economic indices."[6]

This principle is adhered to even now. It is easy to judge how much the adopted principle is purposeful, definite and substantiated. Following it one can adopt almost any system of working. The principle orients towards high rates of oil extraction, and consequently, towards high values of the coefficient of drop.

It should be noted that until now for a separate field the selection of the efficient system that completely meets the criterion of minimum outlays even with the use of different auxiliary methods has been implemented approximately. It is necessary to link the question of the efficient system of working the field with the planned assignments for oil extraction.

The scientifically substantiated plans for oil extraction compiled for the future make it possible beforehand to provide for the development of such systems of working the fields that would take into consideration the change with time in the conditions of exploration, extraction and transportation of the oil.

In the VNIINeft' [All-Union Scientific Research Institute of Petroleum and Gas] development of the methods for constructing scientifically substantiated plans was started back in the 1950's. Certain results were obtained and published, however the work was not brought to an end. A fairly long interruption occurred. Only in recent years have these works (in a more complete formulation due to their increased urgency) become widespread in a number of institutes of the USSR Academy of Sciences, USSR Gosplan and the branch. The results of these works are most completely reflected in a collection.[7] On the whole one can note that currently work is approaching the stage of completion.

We now assume that efficient systems have been established for working and the volumes of work for individual regions in accordance with the optimal arrangement of oil extraction for the country. The question arises: is it possible to rapidly realize these decisions? One has to answer this question that with the extant situation their realization to a full measure is impossible.

The fact is that the found solutions will not correspond to the potentialities present in a certain region for the development of work, in the first place, drilling operations. Difficulties of the optimal development of drilling operations for individual regions due to the limited potentialities of maneuvering the drilling facilities are a consequence of the extant organizational structure of the branch. Currently the main oil extracting enterprise is an association for oil extraction in which all the services are represented that are necessary for the extracting enterprise. However, the need for and effectiveness of certain types of work are drastically altered in time. Thus, for example, in the initial period the search and exploration and drilling operations are very effective, but with current rates of conducting drilling operations by the time of complete development of the drilling capacities, the need for them begins to drop sharply and the question arises of guaranteeing the operation of the created capacities.

The escape from this situation can be the creation of that organizational structure that would be fairly flexible and maneuverable, and without special difficulties and losses could guarantee the optimal placement and volume of different types of work practically at any time and in any region. It is possible that such a structure could be implemented by isolating from the production associations for oil extraction into specialized associations such type of work whose effectiveness and need for in the oil extracting associations is sharply altered in time (for example, drilling operations). Such specialized associations can guarantee more rapidly the realization of optimal volumes of work for exploration and drilling out in different regions with a comparatively stable volume of work for the specialized association itself.

Here the oil extracting associations should reduce the volume of drilling operations to a minimum, providng only drilling of reserve or replacement wells whose use will permit the obtaining of an economically expedient degree of extraction of oil supplies from the beds.

In conclusion I would like to note that further control of the oil extracting industry, with the volumes of development it has attained and the proposed potential resources requires the accurate and timely conducting of expedient measures and substantiated forecasting. If such a situation is not guaranteed, then we risk permitting serious miscalculations whose correction will require a long time and large outlays of resources and labor.

FOOTN[illegible]S

1. B. T. Baishev; V. V. Isaychev, [illegible] Kozhakin; Ye. I. Semin; and M. L. Surguchev, "Regulirovaniye protsessa razrabotki neftyanykh mestorozhdeniy" [Regulation of Processes of Working Oil Fields], Moscow, Nedra, 1978, pp 7, 31, 35.

2. A. P. Krylov, "Stabilization of Oil Extraction and Concentration of Well Network," NEFTYANOYE KHOZYAYSTVO, No 4, 1974.

3. A. G. Kovalev; and A. P. Krylov, "Effect of Density of Well Arrangement on Bed Oil Output," IZV. AN SSSR. OTD. TEKHN. NAUK. METALLURGIYA I TOPLIVO, No 3, 1959, pp 152-157.

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5. V. A. Bad'yanov; Yu. Ye. Baturin; Ye. P. Yefremov; I. A. Ponomarev; N. K. Pravednikov, "Sovershenstvovaniye sistem razrabotki neftyanykh mestorozhdeniy Zapadnoy Sibiri" [Perfection of the Systems for Working Oil Fields of West Siberia], Sverdlovsk, Sredne-Ural'skoye knizhnoye izd-vo, 1975, p 175; V. S. Kovalev; and V. M. Zhitomirskiy "Study of the Effect of Bed Discontinuity on the Indices of Working it and the Final Oil Output," NEFTYANOYE KHOZYAYSTVO, No 8, 1978.

6. Decision of the all-union conference on the problem "Paths for Further Perfection in the Systems of Working Oil Fields with Flooding" held by the Scientific and Technical Council and the Central Commission for Working Oil Fields of the Ministry of the Petroleum Industry jointly with the Central and Tatar oblast administration of the I. M. Gubkin Scientific and Technical Association of the Petroleum and Gas Industry that took place in 1973 in Al'met'yevsk, Moscow, 1974, p 4.

7. "Metody optimal'nogo planirovaniya dobychi nefti" [Methods of Optimal Planning of Oil Extraction] (materials of out-of-town session of Scientific Council for Problems of Working Oil Fields of the USSR Academy of Sciences and the Scientific Council of the Ministry of the Petroleum Industry that took place in June 1976 in Tyumen'), Moscow, Nauka, 1978.

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SOVIETS WORK MAJOR AFGHAN GAS FIELD AT DZHARKUDUK

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 27 Jan 80 p 3

[Article by Ye. Borodushkin, engineer: "The Underground Warehouses of Dzharkuduk" and commentary by R. Kuprevich, chairman of the all-union association Tsvetmetpromeksport]

[Text] Today still another modern industrial project has appeared on the map of the Democratic Republic of Afghanistan--a production of Soviet-Afghan economic and technical collaboration. A large gas field is going into guaranteed exploitation at the Dzharkuduk deposit in the north of the country. This project was planned and constructed under a contract concluded by the Afghan side with the all-union association Tsvetmet-promeksport. The complex of works carried out received a high evaluation from the Afghan state selection committee presided over by the president of the DRA [Democratic Republic of Afghanistan] department of gas extraction and transportation, (Khaydari).

I was lucky enough to be a direct participant in this construction project, which is large even by our standards. In the rocky desert, under harsh climatic conditions--frosts of as much as 20 degrees and strong winds in winter and heat as great as 45 degrees in the shade in summer--the envoys of the Land of the Soviets gave their skill and energy to the development of a project important to the republic. Work was conducted in this region for several years. There were many problems, and the chief one consisted of the fact that the Dzharkuduk deposit contains gas with hydrogen sulfide and carbon dioxide impurities, and in order to use this "gift of nature" it was necessary to purify it. The experience of Soviet experts of the Ministry of the Gas Industry and the Ministry of Construction of Petroleum and Gas Industry Enterprises came to their aid. They had the prospecting, planning and development of similar projects in Orenburg and Mubarek under their belts.

The fight for the Dzharkuduk gas lasted three years. Equipment was delivered to the site across steppes and deserts. And how complicated its route was! First via railroad as far as Termez, then transshipment to barges, a trip along the wayward Amu-Dar'ya, again transshipment, this time to trailers

Mohamed Yunus is an arc welder. Like dozens of other Afghan workers he has become a professional expert by undergoing instruction and practical training with the help of Soviet colleagues.

Soviet instructor P. Kravchuk conducts lessons with Afghan workers.

in the port of Heiratan, then a long, almost 300-kilometer journey. Over-sized industrial towers weighing as much as 160 tons had to be handled with particular care: one time even the decks were unable to support such a load, and they had to be reinforced with steel girders. But the people held up.

Now all this has been left behind. But memories remain of everyday working life, heated arguments over designs and documentation, joint friendship soirees, concerts where Soviet and Afghan songs were performed. Thousands of tons of equipment and metal structures were assembled as a turn-key project by Soviet and Afghan workers. Yes, welders and electricians, KIP [check and test point] workers and future operators--representatives of the young working class of the young republic--worked hand in hand with their Russian comrades. Such collaboration did not spring up by accident. For it was the Afghan experts who had to work on the most complicated equipment, and it was they who had to gain an understanding of the gas field installation in all its minutest details. And where is it possible to understand and solve emerging problems if not in assembling and adjusting? And the young Afghans have justified the confidence shown: they had an excellent theoretical foundation under their belts--knowledge obtained under the direction of Soviet teachers in training classes organized specially at Mazari Sharif Technical School and practical skills acquired during on-the-job training at the Orenburg condensed gas deposit.

Today Dzharkuduk gas is no longer a buried treasure. The skilled hands of Soviet and Afghan workers have wrested it from the embrace of the depths. Now it belongs to the people of Afghanistan. And this treasure is perhaps not inferior and very likely is in some respects superior to the treasures of the ancient Kush empire which Soviet archeologists discovered not far from here. And it is no accident that a monument to Soviet-Afghan friendship--a symbol of the firmly established ties of the two neighbor countries--is being raised by joint efforts on the territory of the Dzharkuduk field in honor of long and fruitful collaboration. And this friendship with the Democratic Republic of Afghanistan, reaffirmed by such practical matters as the start-up of the Dzharkuduk gas field and many dozens of similar matters, cannot be broken up by any enemies or opponents.

Commentary by the Chairman of the All-Union Association Tavetmetpromeksport, R. Kuprevich

For many years Soviet organizations have been doing considerable work in the development of new industrial projects in friendly Afghanistan. Together with the organizations of the Ministry of the Gas Industry and of the Ministry of Construction of Petroleum and Gas Industry Enterprises --and we are proud of this--our association has fulfilled the honorable task of setting up gas fields and and pipelines at the deposits in the north of the republic. The first field at the Khodzha-Gugerdar deposit was put into industrial exploitation back in 1967. This started the

development of the chemical industry of Afghanistan, which came into being with the firstling--the nitrogen fertilizer plant in Mazari Sharif, also built with the technical assistance of the Soviet Union. In order to utilize natural gas, gas pipelines were laid, primarily to the enterprise in Mazari Sharif. Further increase in consumption of gas as a raw material and fuel required an increase in its extraction. This was achieved by putting the gas complex at the Dzharkuduk deposit into exploitation. Built under a general turn-key contract, it will give the friendly country an additional two billion cubic meters of gas and approximately 15,000 tons of condensed gas per year.

In addition to technical assistance the Soviet experts are helping train national personnel to service the new industrial projects. In recent years through the efforts of our association alone approximately 1000 skilled operators, compressor operators, welders, electricians and other specialists have been trained. They have assumed a large part of the load at operating gas fields and pipelines.

Our work in rendering technical assistance in the development of the republic's gas industry is not ending with the putting into exploitation of the new field. Ahead of us are the construction of a new (dozhimnoy) compressor station at the operating gas field in Khodzha-Gugerdar, the building of a new section of the gas pipeline and the creation of a bulk plant in the region of Kabul and Heuratan. Work has already begun on these projects.

General appearance of the gas field at the Dzharkuduk deposit.

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